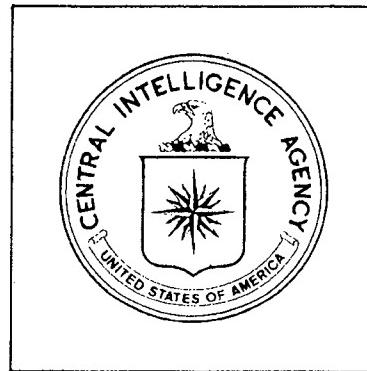


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*Soviet Commentary on the Capabilities
of US General Purpose Forces*

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
July 1974

RESEARCH PAPER

Soviet Commentary on the Capabilities
of US General Purpose Forces

Key Findings

Soviet analysts--as reported by the military press, [redacted]
have favorably appraised some features of US general purpose forces and programs:

- the sophisticated technology incorporated in certain weapon systems
- the flexibility of US general purpose weaponry
- the professional competence and thorough training of various US units
- the size of the US military R&D effort and the speed with which new weapon systems are devised and deployed to the field
- the opportunity afforded the US by the Vietnam war to test and improve its general purpose forces.

Soviet military commentators have spoken disparagingly of certain other features:

- older US weapon systems which, though still operational, are judged obsolescent

Comments and queries regarding this paper are welcomed.
They may be directed to [redacted]

Office of

Strategic Research [redacted].

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- the vulnerability of certain US systems to enemy fire
- the inadequate kill effectiveness of some US systems
- theater combat service support facilities.

Soviet commentary suggests that US general purpose forces have been evaluated against the standards of an implicit Soviet model for satisfactory combat performance. There are clear indications, however, that the criteria used to assess weapon systems do not include comparative assessments with their Soviet counterparts. In several cases, Soviet operational weapon systems suffer from the same deficiencies for which US equipment is criticized. There are also some suggestions that Soviet modeling of ground forces interactions contains serious shortcomings and that the Soviet scenario for a Central European war reflects a highly optimistic view of the outcome.

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Introduction

This research paper addresses a series of questions raised by Andrew W. Marshall, Director of Net Assessments, Office of the Secretary of Defense. Mr. Marshall requested an analysis of the characteristics and activities of US general purpose forces which in the Soviets' view made the greatest impact on the Soviet national security community. He suggested that an examination of Soviet commentary on American weaponry and technology, combat experience and peacetime maneuvers, and training and professional conduct in the general purpose forces might yield information which would identify those elements of US military power which are viewed with particular interest by Soviet defense decisionmakers.

This paper discusses the following aspects of the subject: (1) the institutions and processes through which components of the Soviet national security community obtain their data and develop their views on US military forces; (2) the assessment of US general purpose forces which is reflected in the Soviet scenario for war in Central Europe; and (3) the substance of Soviet opinions regarding US ground forces, tactical air forces, air transport, and general purpose naval forces.

This paper aggregates and analyzes explicit Soviet statements which appear to reflect perception and evaluation of US general purpose military capabilities. Soviet commentary in this area is abundant. It consists of a large amount of straightforward description of US weapon systems and military activities and a considerably smaller number of evaluative statements on these subjects.

The material is derived from Soviet open and classified published commentaries on military affairs,

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[Redacted] The information in open military journals is generally consistent with that in classified articles and with data available from other sources. Classified commentaries, however, have sometimes been based on information apparently acquired through Soviet intelligence efforts. The primary research effort for this paper has focused on data available after 1967.

The substantive evaluations of US general purpose forces contained in Soviet material have been treated cautiously. Articles in both the classified and unclassified military press are usually written by field grade officers with expertise in the subject areas. It is apparent that such commentaries carry some degree of authority, since they must be approved for publication by higher officials. Explicit evaluations of US forces presented in the articles are frequently identified as the opinions of unnamed "foreign military specialists." Such citations appear to be carefully selected. Therefore, this paper treats opinions presented in this manner as equivalent to the approved professional judgments of the Soviet authors themselves. In addition, this study identifies implicit evaluations in Soviet descriptive materials from the context in which they are presented.

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Contents

	<u>Page</u>
Soviet Evaluations of US Military Capabilities	7
Strengths Ascribed to US Forces	8
Weaknesses Imputed to US Forces	10
Omissions in Soviet Commentary	11
Soviet View of Central European War as an Assessment of US General Purpose Forces	13
Soviet Intelligence Collection and Analysis	17
Intelligence Requirements	17
Intelligence Exploitation	19
Commentary on Specific US Capabilities:	
Ground Forces	23
Tank Warfare	24
Tanks	24
Artillery	26
Antitank Capabilities	28
Tanks and Artillery	28
Antitank Guided Missiles	28
Other Antitank Ordnance	29
Helicopter Gunships in Antitank Role . .	30
Armored Personnel Carriers	31
Nuclear Weapons	31
Tactical Surface-to-Surface Missiles	32
Reconnaissance and ECM Equipment	34

~~TOP SECRET~~

~~TOP SECRET~~

	<u>Page</u>
Air Mobility	35
Helicopter Gunships	35
Transport and Reconnaissance	
Helicopters	36
Tactics and Organization	37
Training and Professionalism	40
Naval Forces	42
Ships and Equipment	43
Aircraft Carriers	43
Frigates, Destroyers, Destroyer	
Escorts	45
Small Combatants	46
Logistic Support Ships	46
Amphibious Ships	47
Submarines	48
Ordnance	49
Mines	49
Torpedoes	49
Cruise Missiles	50
Antisubmarine Warfare	50
Tactics	52
Amphibious Operations	52
Mine Warfare	53
Tactical Air Forces and Air Transport	53
Weapon Systems	55
Fighter Aircraft	55
Airborne Missiles	57
Precision-Guided Munitions	58
Airborne Electronic Countermeasures . . .	59
Pilotless Vehicles	59
Transport Aircraft	59
Tactics	60
Tactical Air Defense	61

~~TOP SECRET~~

~~TOP SECRET~~

Soviet Evaluations of
US Military Capabilities

Adversary perception is an important dimension of the US-USSR military relationship. Assessments of US military capabilities are employed by several components of the Soviet national security community in defense planning and policy implementation. The Soviet weapons development community, for example, uses reports on the status of Western equipment to devise both emulative and offsetting systems. Soviet military planners incorporate judgments of the strategic and tactical concepts which such Western equipment reflects as well as interpretations of the meaning of general Western military doctrine into their own planning for a possible war in Central Europe. Assessments of US military capabilities are also disseminated throughout the Soviet Armed Forces as part of a standard process of education and indoctrination. Finally, in the formulation and implementation of defense policy, individual components of the Soviet defense community appear to find it advantageous to manipulate the degree of threat presented by the US when lobbying for their own military programs.

The final judgments on US military forces are integrated into long-term defense policy planning, into programs for future weapons development and procurement, and into guidelines for current deployment and operation of Soviet forces. Through the analysis of intelligence materials, it is possible both to outline the Soviet view of US forces and to suggest those factors which affect the Soviet evaluation.

Soviet commentary on US general purpose military capabilities suggests that they are evaluated against the standards of an implicit Soviet model of satisfactory combat performance. This model appears to be based on assessments by the Soviets of the limits of current technologies, their own achievements in weapons development, their observations of foreign accomplishments in particular sectors of military activity, and their projections of reasonable developments in modern combat. US weapons appear to be rated for

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their survivability, employment flexibility, and kill effectiveness. US forces also appear to be judged according to the proficiency of their personnel.

There are clear indications; however, that US forces are not always rated on the basis of comparative assessments with their Soviet counterparts. In several cases, Soviet operational weapon systems are known to suffer from the same deficiencies for which Soviet military commentators have criticized similar US equipment. Moreover, in some cases the Soviets possess nothing even roughly comparable to the US system under critical examination.

Strengths Ascribed to US Forces

1. Soviet military commentators have shown great admiration for the technological sophistication of US weapon systems and equipment. Antitank missiles, precision guided munitions, influence mines, antiaircraft and antisubmarine armaments on the newer US surface combatants, and improved fire-control systems for tanks, artillery, and aircraft have been cited for their potential for delivering greater firepower with higher accuracy. American ground electronic countermeasures (ECM) equipment has been credited with capabilities both to disrupt enemy operations and to reduce the vulnerability of US systems. All aspects of Western technology are closely followed by Soviet analysts because of the possibility that new developments could radically change battlefield tactics and alter military doctrine.

2. Soviet authors have consistently acknowledged the flexibility of US general purpose weaponry. They have noted improvements to the cross-country capabilities of tactical missiles and artillery, the development of helicopter gunships for fire support operations, the use of helicopter-mounted antitank missiles, and the reliance on airmobile operations--all recognized as contributing to the speed with which US firepower can be concentrated and dispersed in combat. Attack carrier strike units and fighter-interceptor elements have also been cited for the rapidity and

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flexibility with which they can be employed throughout a combat theater. Attack carriers have received attention for the great variety of weapon systems which they can bring to bear in crisis and combat operations.

3. Soviet military writers have recognized the professional competence and the thorough training of various US forces. The success of US tactical air forces in bombing and minelaying operations during the Vietnam war has been attributed to the realistic training and skill of the pilots. US tactical missile forces and airborne units have been classified as formidable opponents because of their high state of combat readiness. The meticulous training of special forces, airborne and airmobile units, and amphibious forces, demonstrated in their operations in Vietnam, has been cited. US air transport and sealift capabilities and the lengthening of attack carrier on-station time have been noted in contexts which suggest Soviet respect for the proficiency of the personnel involved. Commentators have noted the ease with which US forces adopted new tactics to meet incremental improvements in North Vietnam and Viet Cong capabilities. The potential of the all-volunteer system for increasing and stabilizing the number of qualified specialists available to US general purpose forces has also been discussed.

4. Soviet commentators have shown respect for the size of the US military research and development effort, the speed with which the US weapons development community can devise new weapon systems, and the rapidity with which such weaponry can be deployed to the field. The Soviets have been especially impressed by the development of helicopter gunships, improvements in airborne ECM capabilities, and the rapid evolution of helicopter-mounted antitank guided missile systems. Their comments indicate admiration for the responsiveness of the US weapons community to the needs of the armed forces on the battlefield.

5. Soviet commentators have reflected envy of the capability afforded the US by the Vietnam war to test and improve its general purpose military forces.

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They have noted that the war stimulated development of general purpose weaponry and that US military personnel were given a unique opportunity to obtain first-hand combat experience.

Weaknesses Imputed to US Forces

While most evaluations have been positive, there are some recurring criticisms in Soviet commentary on US general purpose military capabilities.

1. The Soviets deprecate many US weapon systems which they consider obsolescent. These systems, which were developed and initially deployed at least a decade ago, include the M60A1 tank, a substantial portion of the Navy's destroyer fleet and amphibious landing craft, the Pershing and Sergeant tactical missiles, the MK-46 ASW torpedo, and the Bullpup air-to-surface missile. The Soviets appear to reach their assessments in three ways:

- a. they observe that the US has undertaken the development of replacement systems;
- b. they perceive that aging of the system has significantly impaired its operational performance;
- c. they judge that the capabilities of the system under discussion are not adequate to meet what they label as modern combat requirements, a phrase which probably reflects the standards of their implied model.

2. The Soviets have frequently faulted US weapon systems as vulnerable to counterweapons, including among these systems tanks, fighter aircraft, pilotless reconnaissance drones, and reconnaissance, transport, and attack helicopters. Such criticism apparently reflects judgments that the weapon systems do not possess a level of survivability adequate for sustained effective combat.

3. The Soviets have criticized several US systems for inadequate kill effectiveness, including the Side-

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winder and Sparrow air-to-air missiles and the Shrike antiradar missile. A few systems, including the Bull-pup, the Shrike, the MK-48 torpedo, and the Vulcan antiaircraft artillery system, have been specifically faulted for lacking enough explosive power to disable the target when a hit is scored.

Omissions in Soviet Commentary

A few important elements of US general purpose forces have not received appreciable critical attention in Soviet commentary. This suggests that the Soviets do not consider them significant and thus are likely to underrate US capabilities in these areas.

1. Soviet commentators have rarely discussed US theater combat service support capabilities. Although they have frequently commented favorably on American long-distance airlift and sealift capabilities, they have hardly analyzed the administrative, maintenance, medical, supply, and transportation elements associated with US ground and air units. The specialized monthly journal dealing with these subjects--*Rear Services and Supply of the Soviet Armed Forces*--for example, has not published an article on US theater combat service support capabilities in the past decade. The monthly *Foreign Military Review* has recently published one article on NATO mobile ground forces which commented on the "complexities of logistic support" for these units.

The late Minister of Defense, Marshal Malinovskiy, addressed this subject in the early Sixties. In a highly classified military publication he described American logistic support as "cumbersome" and claimed that the leaner Soviet combat formations would enjoy "great advantages" in "conducting operations under conditions of nuclear weapons employment." Another Soviet author, in a classified assessment of a NATO exercise held in the early Sixties, also criticized the redundancy, compartmentation, and complexity of NATO's theater support services. In light of increased Soviet and American efforts over the past several years to prepare for conventional combat, the

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continued validity of these judgments is not certain. The recent published reference to NATO's logistic complexities does suggest that the Soviets continue to discount these capabilities. This evaluation could be influenced by their doctrine for war in Central Europe, which envisages overwhelming NATO's defenses so quickly that there would be no requirement for sustained logistic support.

2. The Soviets have not commented on the growing antitank potential of tactical air power. Although they have expressed respect for US ground and helicopter-borne antitank weapons and have reported favorably the general features of precision-guided munitions, the commentators have not discussed the increased antitank capabilities of US tactical aircraft using cluster bombs (Rockeye) and precision-guided munitions (Maverick, Hobo). This omission probably is simply the result of inadequate lead time for the appearance of Soviet critical commentary, as the US capabilities have only recently been demonstrated. The success of these US-made systems in Israeli-hands-during-the October 1973 war and the flood of favorable Western discussion that followed are likely to have triggered a careful Soviet examination of these systems which is yet to be reflected in the commentary.

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Soviet View of Central European War as
an Assessment of US General Purpose Forces

Over the past 15 years the Soviets have developed plans for a possible war in Central Europe, and have regularly conducted military exercises, in accordance with a basic scenario which outlines a rapid defeat of NATO by the Warsaw Pact. In the early Sixties, Soviet doctrinal writings and Warsaw Pact exercises had postulated that nuclear strikes from strategic forces based in the Soviet Union, delivered at the beginning of hostilities, would permit advances by Pact ground forces at a rate approaching 100 kilometers per day. These nuclear strikes would be followed by a sustained and rapid advance of mobile, heavily armored Pact ground formations. In a series of high-intensity assaults, these units would be expected to break through NATO's forward defenses and overrun Western Europe within 14 to 20 days.

Since the mid-Sixties the Soviet scenario has added a nonnuclear phase to the opening stage of hostilities and adopted a lower estimate of the rate of advance of Warsaw Pact forces. During the non-nuclear phase Soviet planners expect massed Pact formations to assault NATO defenses, rapidly exploit the resulting breaches in the NATO lines, and roll back NATO forces at a rate of 30 to 50 kilometers per day. In the subsequent nuclear phase, Pact movements across Europe would be expected to accelerate to 60 to 80 kilometers per day, a rate of advance below that projected in the early Sixties. Despite these refinements, Soviet plans still anticipate a relatively quick triumph by the Warsaw Pact.

This scenario may reflect the influence of two different frameworks of analysis and judgment. The Soviet plan may be derived from an examination of the relative combat capabilities of the Pact and NATO. In this case, Soviet assessments could be drawn from detailed force-against-force analyses, from intuitive professional judgments, and from study of NATO doctrine and exercises. Alternatively, the basic scenario may represent an idealized product of the norms

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established by traditional Soviet military doctrine. In this case, the plan would simply assume the successful completion of individual operations and would scarcely be linked to any assessment of NATO capabilities. The existing evidence is insufficient to support conclusively either interpretation.

Soviet classified military writings include many explicit claims that aspects of the projected theater campaign have been based on "experience gained in combat training exercises, computer calculations, research projects, and war games." Many of these activities have been identified as the work of higher military academies of the Ministry of Defense.

Although analytical studies are undoubtedly undertaken in support of Soviet military planning, evidence suggests that the simulations and mathematical models have serious shortcomings. One commentator in a classified military journal indicated that Soviet interactive computer analyses of opposing ground forces were at an elementary stage of development. He noted that the results of simulated battles which had been held were "insufficiently conclusive, debatable, and sometimes even doubtful" because of disagreements over terms of reference and the poor quality of the data used. A recent exchange of opinions published in a limited-circulation military journal was marked by disagreement over the development of the basic equation for calculating the rate of advance of ground forces.

[redacted] indicated that Soviet modeling of NATO general purpose force capabilities was rudimentary. Thus it is doubtful that Soviet projections regarding the likely course of a war in Central Europe reflect complex net assessments of Warsaw Pact and NATO forces.

Soviet estimates of likely victory may represent largely intuitive professional judgments which roughly weigh the size, deployments, and doctrines of NATO and Warsaw Pact forces. Soviet assessments in this area could easily be influenced by careful study of NATO's major military exercises. The Soviets have

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monitored these exercises closely and often have produced detailed classified critiques. These commentaries have noted that since the mid-Sixties NATO scenarios for the biennial Fallex and Wintex series have uniformly depicted steady Soviet advances of 30 to 50 kilometers per day during the opening, conventional phase of war.

The Soviets are aware that the NATO exercises have consistently called for the selective use of nuclear weapons to stem the Pact's advance. Their assessments note that this selective use is expected to fail and that NATO then employs a large-scale nuclear attack throughout the theater. Soviet planners realize that this nuclear attack is intended to halt the Pact offensive and to permit the initiation of a successful NATO counteroffensive. The assessments of NATO and Warsaw Pact general purpose force capabilities which are implicit in NATO exercise scenarios could easily be assimilated by Soviet experts into their own planning process.

The Soviet outline for victory over NATO in the Central European theater may also reflect arbitrarily mandated objectives. Since the mid-Thirties Soviet military doctrine has tended to define the course of combat operations within a relatively rigid framework of traditional norms and prescribed planning goals. According to these precepts, massed armored formations would undertake bold offensive actions, seize the initiative, and overwhelm their opponents.

Soviet doctrine in the nuclear age continues to reflect these standards, but the military planners have raised the anticipated rate of advance of Pact forces, specifically noting that the nuclear battlefield would be highly conducive to the assault-breakthrough-exploitation doctrine. Soviet commentators have stated that the rate of advance must be fast enough to prevent the regrouping of NATO forward forces, and the planners may also have intended a rate which would ensure the complete occupation of Western Europe before NATO was fully mobilized and before the US could dispatch substantial reinforcements.

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Classified military writings of the early Sixties suggest that the rate of advance represents an arbitrarily selected planning norm. Most writers simply asserted without analysis that rates of 80 to 100 kilometers per day were to be maintained during the offensive. A few authors noted that such speeds were unrealistic and not likely to be achieved if Pact forces encountered serious enemy resistance. The 100-kilometer rate was nevertheless identified by one author as the "requirement of the Minister of Defense."

Classified writings of the late Sixties suggest that these rates continue to represent planning objectives rather than the products of force interaction studies. A senior military commander stated that Warsaw Pact forces could "hardly count" on attaining the prescribed 70 to 80 kilometer daily rate of advance since they could be expected to suffer large losses from NATO nuclear strikes. Another commander noted that during Soviet exercises prescribed rates of advance had "often failed to coincide with actual capabilities." He claimed that incorrect estimates of the influence of rugged and mountainous terrain accounted for frequent disruptions in the timetables of exercises. Another author discussed engineering work required to assure the accomplishment of the "prescribed rate of advance."

In sum, the Soviet scenario for a war in Europe probably is an admixture of both the traditional desired course of operations and a highly confident depiction of the outcome of such a war. NATO - Warsaw Pact comparative evaluations which can be inferred from these plans may be based on only the numerical advantages which the Pact enjoys in the forward areas. It is doubtful that the depreciation of NATO implied in the Soviet scenarios represents a rigorous net assessment of US general purpose force capabilities.

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Soviet Intelligence Collection
and Analysis

Intelligence Requirements

The collection efforts directed against US general purpose forces by the Soviet intelligence community fall into two categories: routine monitoring of order of battle information, exercises, deployments, and weapons characteristics; and specialized intelligence-gathering operations undertaken during crises and in response to unique collection opportunities. These efforts exploit the full range of Soviet collection capabilities, including agents, communication intercepts, satellite photography, and unclassified Western publications.

Routine monitoring of US order of battle and tactical data is coordinated with requirements developed by several elements of the defense establishment. Specific requests by individual agencies are organized into aggregate lists which are distributed to components of the intelligence community for collection. For example, the General Staff disseminates to Warsaw Pact members, apparently on an annual basis, a comprehensive list of intelligence requirements related to US and NATO forces.

The General Staff's Main Intelligence Directorate (GRU) also issues guidelines to its signal intelligence units and local agents, which designate significant areas of information connected with US and NATO forces. Local GRU Sigint units routinely dispatch data to GRU headquarters on the status and activities of US theater forces in Europe and US general purpose naval forces.

[] a standing requirement to report NATO combat readiness checks immediately to GRU headquarters in Moscow. [] data gathered from Sigint sources on tactical nuclear missiles, US and NATO higher command personnel, scenarios and critiques of US and NATO exercises, and the US position on MBFR (mutual and balanced force reductions) were routinely summarized and dispatched to Moscow.

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[] [] high priority was assigned to the collection of data on the US Seventh Fleet.

Field agents working for the GRU and the KGB apparently gather similar information. The General Staff has used clandestine sources to obtain NATO exercise scenarios and expects to rely on agent intelligence during a war in Central Europe to furnish adequate advance warning of a NATO decision to use nuclear weapons. Soviet military advisers attached to North Vietnamese units probably furnished a substantial portion of the observations on US aerial tactics which have appeared in classified Soviet military publications. Soviet military attaches take full advantage of invitations extended by US services to observe military forces and equipment in action and gather other relevant military data for dispatch to the GRU.

The routine collection of foreign scientific and technological military data is handled in a similar manner. The GRU and KGB compile and disseminate collection requirements concerning developments in US military technology. Design bureaus and factories involved with weapons development and production are able to request technical data on US military equipment through their parent ministries. These requirements are usually coordinated by the Military-Industrial Commission (VPK) and then levied on information collection agencies. In accordance with guidelines furnished to the field, GRU and KGB agents procure samples of US weapons and ordnance, operations manuals published by the armed services, and manufacturers' information on selected equipment. Soviet military attaches and special military advisers stationed in crisis or combat areas endeavor to gather information and samples of US weapons. For example, Soviet military advisers attached to North Vietnamese units were required to collect US equipment both on their own initiative and through formal liaison channels established with the North Vietnamese government.

Soviet intelligence collection agencies have shown heightened sensitivity to the activities of US forces during periods of international crisis. At

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the outbreak of the 1973 Middle East war, a contingency plan calling for increased Middle East collection and reporting was implemented by at least one Sigint regiment in a Soviet military district.

During the war, Sigint units in this district were ordered to increase the surveillance of military and civil air transport flights which might carry volunteer personnel and materiel for Israel. Shortly after the US announced on 25 October that its forces had been placed on alert, the Soviets stepped up Sigint collection, especially by units in those areas of the USSR nearest the Middle East. These units were ordered to go on double shifts

Soviet collectors also engage in large-scale, coordinated intelligence-gathering efforts in response to unique collection opportunities. Although little coordination of efforts normally exists between GRU and KGB field agents, during the latter part of the Vietnam war, about 1972, the Politburo sanctioned vigorous joint efforts by the intelligence agencies to gather all available technical data on US aircraft shot down over North Vietnam. There is evidence that a major intelligence-gathering effort, sanctioned by the Politburo, was undertaken behind Egyptian lines after the conclusion of the October 1973 Middle East war.

Intelligence Exploitation

The data gathered by intelligence collectors on US military forces are analyzed by several agencies which furnish information to the Soviet national security community. The assessments made by these components are disseminated through many channels to interested recipients in the community.

In extensive, parallel efforts, several Soviet agencies engage in systematic extraction of materials on US military forces from open publications. Some defense industrial ministries and their design bureaus maintain open-source data files on Western weapon systems relevant to their areas of interest.

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The Ministry of Defense engages in a similar effort on a larger scale: the Central Institute of Military Technical Information and scientific and technical sections within each of the military services maintain their own information systems on developments in Western technology and tactics. Departments of military technical information in scientific research institutes and certain academic institutes, most notably the USA Institute and the Institute of World Economics and International Relations (IMEMO), also collect data from US open publications on American weapons development and US national security policy.

The results of this careful monitoring of open source materials are seen in the numerous articles on US military activities carried in Soviet military publications of both the unclassified and restricted-circulation types. Commentaries on US weapons programs and military tactics are frequently written by military journalists and members of academic institutes and are commonly attributed to materials "from the foreign press." These materials are the basic source of information on US capabilities for most members of the Soviet Armed Forces.

[redacted] the articles and foreign translations published in the limited-circulation monthly *Foreign Military News* provided [redacted] background on the US military. This publication is frequently cited in classified military documents as the source of data on Western military forces.

Similar data are published in unclassified monographs on military subjects and in textbooks used at military training institutions. Defense production ministries prepare a variety of publications which abstract foreign literature in their areas of expertise. Books and articles on US forces and defense policy are published by members of the academic institutes.

The open-source materials on US military programs collected in the Institute of World Economics and International Relations have been used as the basis for studies prepared for a more limited audience. Staff

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members of the Institute have employed these resources to conduct exercises simulating international negotiations, the results of which are forwarded to the appropriate departments of the Central Committee. A special closed section staffed by military personnel is reported to have utilized the Institute's unclassified data on military matters in combination with Soviet attache reports, to respond to requirements for analysis submitted by the General Staff.

studies on US military affairs done in the closed section may cover a variety of subjects related to defense policies and weapon systems.

Classified descriptive data on US weapon systems are prepared in Ministry of Defense facilities for use within the Ministry, in the weapons development community, and at military schools. The Central Institute of Military Technical Information, for example, issues reports on foreign arms to components of the Ministry of Defense and the defense industries. A typical report contains a detailed description of a system, photographs, maps indicating its probable deployment, an evaluation of its capabilities, and recommendations for tactics to counter it.

the use of a 50-page Soviet book on the C-5A transport at the Antonov design bureau. the existence of classified studies on many US weapon systems which are used by students at military academies in research on tactical problems.

a 40-page book which described and analyzed the capabilities of the US Hawk surface-to-air missile system for his own tactical problem.

similar information on other weapon systems.

More sophisticated analyses of current weapons programs, trends in weapons development, tactics, and US and NATO exercises are prepared within the General Staff. Most of these reports are based in part on data obtained clandestinely from the West, in crisis or combat areas, or through Sigint resources. The results have appeared in classified military periodicals, in articles analyzing US or "enemy" capabilities in

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discussions of the conduct of theater operations and specific tactics of battlefield engagement. The Central Institute of Military Technical Information has prepared forecasts of foreign weapons development in accordance with what its members perceive to be the objectives of the foreign powers. The higher military schools of the Ministry of Defense perform similar work, preparing assessments and projections on specific types of military equipment.

The products of General Staff and similar analyses have sometimes been contained in detailed briefing data periodically distributed to active units of the armed forces.

[] a 30- to 50-page secret information bulletin which summarized and evaluated air combat operations in Vietnam was received [] regularly.

General Staff assessments of US military forces have also been distributed to the members of the Warsaw Pact. The speeches of the chief of staff of the Warsaw Pact to the Pact Military Council often refer to specific NATO capabilities.

[] the existence of ratings distributed by the Soviet General Staff on the effectiveness of US and other NATO ground forces. The General Staff has also prepared detailed analyses of NATO exercises and supplied them to Pact members.

Elements of the weapons analysis, R&D, and production community also make use of materials originally acquired by agent sources. The Bureau of Foreign Military Literature in the Ministry of Defense distributes documents and diagrams of foreign origin at the request of factories. The appropriate departments of the State Committee for Science and Technology have received samples of US military equipment for analysis. One committee member claimed that his department examined parts of an F-111 aircraft. The Antonov aircraft design bureau used data books prepared by the Boeing Corporation on the 707 and 727 passenger aircraft.

[] the receipt of data on Boeing and Lockheed airplanes which had been acquired clandestinely from sources in Great Britain and West Germany.

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Members of the Engineering Research Institute attached to the Military Engineering Academy at Kuybyshev used the data books prepared by the US manufacturer of the Bark and Lark amphibious vehicles as they developed a similar craft. [redacted]

[redacted] Soviet forces in Eastern Europe have great amounts of data, largely in the form of Department of Defense manuals, on US military hardware.

Commentary on Specific US Capabilities:

Ground Forces

Warsaw Pact military planners apparently have employed both quantitative and qualitative criteria to evaluate the relative effectiveness of Western ground forces. Using these standards, they have consistently rated both US and FRG forces as the most important components of NATO. There is very little evidence to suggest that the Soviets have also assessed the comparative effectiveness of NATO and Warsaw Pact forces. However, [redacted]

[redacted] the Soviets consider the Bundeswehr and their own armies to be the main battle forces in Central Europe.

[redacted] quantity of equipment, mobilization capability, quality of weaponry, combat readiness, and combat experience as criteria which have been used by military planners to assess the strength of the Warsaw Pact's potential adversaries. [redacted] instructors at the Military Diplomatic Academy in Moscow consistently cited quantity rather than quality of forces as the standard of judgment used to evaluate the balance between NATO and the Pact. This comment is consistent with the heavy emphasis on the need to achieve numerical superiority along selected axes of attack which pervades Soviet military doctrine.

[redacted]
[redacted] somewhat more sophisticated efforts have been undertaken by the Warsaw Pact to assess NATO ground forces.

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[redacted] the Czechoslovak General Staff prepared monthly evaluations of selected NATO forces, including the US Seventh Army. These reports contained assessments of equipment, combat readiness of forces, and quality of personnel. The grades assigned apparently were consistent with standards established by Soviet planners.

[redacted] the existence of ratings prepared by the Soviet General Staff which were based on evaluations of Western equipment and personnel, drawn from World War II and Korean War data.

[redacted] estimates, [redacted] in 1968 the [redacted] General Staff rated US combat readiness at 4 on a scale of 5. [redacted] in 1970 Soviet assessments assigned the US a measure of effectiveness of .8 on a scale of 1. In the latter case, the West German Army was given the highest evaluation.

The Soviets' respect for the Bundeswehr appears to rest upon their judgments regarding its size and quality as well as their previous combat experience with German armies.

[redacted] Soviet military commanders have a high opinion of the quality of West German reserves and attach great importance to the FRG's rapid mobilization capability.

Tank Warfare

Tanks. Soviet military commentators and command personnel have frequently asserted that Soviet armored forces are superior to those of the US. This opinion has been confidently expressed by Soviet general officers

[redacted] This assessment appears to be based on three factors. First, the Warsaw Pact, according to classified Soviet documents, credits itself with an overall superiority in the number of tanks and artillery available against NATO. Second, Soviet military doctrine provides for the rapid marshaling of numerically superior mechanized artillery and armored forces at the outbreak of hostilities

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along a few selected sectors of the front, where they are expected to be capable of achieving a breakthrough of NATO's forward defenses. Third, the Soviets have been critical of US tanks. Marshal P. A. Rotmistrov, a frequent defender of the role of armored forces in modern combat, has claimed in the open press that Soviet tanks are "superior in performance and fire-power to the best Western and American models," although he has failed to note the criteria used to reach this conclusion.

Some Soviet writers have commented on the capabilities of specific tank models in the US inventory. Authors in the open military press, for example, have suggested that the M60A1 is obsolescent. A 1971 article in the monthly NCO journal (*Starshina-Serzhant*) concerning the abortive US - West German MBT-70 tank project referred to US "dissatisfaction" with the combat capabilities of the M60A1. Rotmistrov has stated that the West German Leopard tank surpasses the M60A1 in speed, cruising range, and roadability, and has noted its lower profile. Several writers in *Red Star*, the daily newspaper of the Ministry of Defense, have also noted the merits of the Leopard, and the Soviets apparently regard it as the best tank in the NATO inventory. Nevertheless, in the context of Western efforts to improve the firepower of tanks, other commentators in the open press have mentioned US efforts to modernize the M60A1 by installing new ballistic computation equipment, improved rangefinders, and an improved cannon stabilization system (which permits the vehicle to fire while moving). They have also noted the larger crew compartment, which permits the M60A1 to carry more ammunition.

Commentators in the Soviet classified press have described a dual-purpose conventional shell and missile launcher as the optimal tank weapon system. One article cited the 152mm cannon mounted on the M60A2 tank, which is capable of firing both conventional shells and Shillelagh missiles, as part of an argument for the development of dual-purpose gun barrels for Soviet tanks. The author predicted that the main battle tanks of most Western nations would be armed with both cannons and missiles by the end of the

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Seventies and that such armaments would enhance their antitank capabilities.

Commentators in the open press, however, have depreciated the utility of dual-purpose weaponry on US tanks. Rotmistrov has said that tank-launched missiles do not now have the capability to compete with conventional tank cannons. He and authors in the monthly *Military Herald* and in *Starshina-Serzhant* have cited West German arguments against arming new tanks with antitank missiles, including the assertion that battles in Central Europe will be fought at ranges too close to make the use of missiles feasible. A writer in *Military Herald* also has disparaged the US emphasis on dual-purpose armament.

Military commentators have followed with interest US development of the M551 Sheridan light amphibious tank. Although they have generally conceded the poor performance of light tanks during World War II, they have noted that the Sheridan is air-transportable and can be delivered by parachute. When these factors are combined with an amphibious capability, "the most important characteristic for a tank's mobility," a *Red Star* commentator has asserted, the result is a vehicle that can increase the mobility of ground forces. Writers have also called attention to the Sheridan's 152mm dual-purpose gun. Rotmistrov has noted that the Sheridan has been combat-tested by the US in the Vietnam war, but no Soviet commentator has presented an assessment of its performance there.

Artillery. [redacted] the instructors at the Military Diplomatic Academy in Moscow generally described US artillery weapons as more flexible, mobile, and mechanized than Soviet models. Open-source writings have cited the addition of 155mm and 175mm self-propelled field guns to the inventory of US forces in Europe as an example of continuing US attention to the improvement of self-propelled field artillery. A recent classified article stressed the mobility and firepower of US artillery, noting that most US artillery was self-propelled, hence difficult to destroy in combat. It credited US artillery with great firepower because of its ability to fire nuclear projectiles.

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Soviet commentators have closely followed the performance of US artillery in Vietnam. Writers in both the open and classified press have observed that the US adapted well to the rough terrain and jungle of Vietnam, which hampered artillery mobility, by establishing fixed bases for fire support and developing new types of long-range ammunition. Both open and classified sources have also cited the use of helicopters to transport light-weight artillery specifically developed by the US for use in Vietnam. A classified article said that artillery was moved by helicopter to "almost impossible locales," while others expressed respect for the frequency and rapidity with which artillery could be shifted by helicopter.

Soviet commentators were generally impressed by the performance of the 105mm M102 howitzer in Vietnam, though some have pointed out deficiencies. A *Red Star* writer cited the M102 as an example of an improved artillery system which maintained its firing range and operational reliability despite a significant reduction in weight. This author noted that it is light and small, and therefore helicopter-transportable, and that it can be easily turned 360 degrees, making it possible to shift fire quickly in any direction. A *Military Herald* writer has called attention to its low-pressure tires, which enhance cross-country maneuverability, and to the rapidity with which it can be readied for firing. This author also claimed, however, that the sight of the M102 often malfunctions, its carriage float plate is weak, and its tube muzzle face rapidly breaks down. A classified article has noted that the US continues to distribute this weapon to its ground forces for use in airmobile operations.

Writers in the open press have reported in general terms Western efforts to improve fire control systems. A *Red Star* commentator has noted the existence of computers which can calculate optimum firing positions from coded data provided by forward spotters. Classified articles have cited the ability of the US Tacfire automated field artillery control system to accelerate the processing of target information, reducing the time required to execute a combat mission.

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Antitank Capabilities

Tanks and Artillery. Soviet commentators have shown great respect for both the quality and effective deployment of NATO antitank capabilities, a substantial portion of which are US-developed weapon systems. The author of a 1973 *Military Herald* article cited the "excellent armor-piercing capability" and the "good range of effective fire" of most systems in the NATO inventory.

distress within the Soviet military over preliminary reports from Arab countries attesting to the effectiveness of US-supplied Israeli antitank equipment during the October 1973 war.

The *Military Herald* article cited above also described the placement of NATO antitank weapons as providing "a sufficiently effective barrier in the path of advancing troops." Classified articles also have given attention to the positioning of NATO's antitank systems. One author noted the ease with which individual commanders could maneuver and reinforce antitank defenses in threatened areas. Another stressed the "serious resistance" which Soviet units would be likely to encounter from NATO antitank systems, even after a nuclear strike on Western defensive positions. Classified writings have stated that the effectiveness of Soviet forces depends to a great extent on an accurate perception of the threat from hostile antitank weapons. It is clear from these sources that military commentators are closely monitoring qualitative and quantitative improvements to NATO antitank weapons.

Antitank Guided Missiles. Most Soviet military commentators have been impressed by Western antitank guided missiles (ATGM).

Instructors at the Military-Diplomatic Academy in Moscow evaluated as "very good" the Shillelagh ATGM which is fired from the dual-purpose 152mm gun carried by the M60A2 and the Sheridan tanks. A classified article reiterated this assessment, naming the Shellelagh in a discussion which noted that missiles were "good antitank weapons." This author asserted that the Shillelagh was ineffective at distances of

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less than 600 meters but concluded that this deficiency did not seriously compromise its utility as an antitank weapon because the 152mm cannon can also fire a conventional round. Unclassified monographs have also noted that missiles are potent antitank weapons when used against targets at ranges greater than 600 meters. However, a *Military Herald* writer added that their low speed and the requirement for continuous guidance to the target seriously compromised the usefulness of these missiles. A 1972 *Red Star* commentary was critical of the Shillelagh because of its limited rate of fire and the absence of a fully automatic guidance system, although the guidance systems of Soviet antitank missiles are even less automatic.

Numerous open-press articles have expressed respect for the TOW wire-guided ATGM. One commentator in a 1971 *Military Herald* article, while referring only to its ground launch capabilities, called it a "powerful means of combating tanks." A 1973 *Red Star* discussion referred to US tests which demonstrated the greatly improved accuracy and range of the TOW in comparison with first-generation ATGMs.

It is clear from other open-source material that the Soviets believe the West will develop an ATGM with a fully automatic guidance system. They apparently anticipate that this missile will surpass the TOW in accuracy, firepower, and range.

Other Antitank Ordnance. Writers in the open press have fully acknowledged the effectiveness of precision-guided aerial munitions in combat and have noted US developments in this field. However, no comment has appeared in either the open or classified press which would convey the Soviet evaluation of these weapons, including the Walleye and Maverick television-guided bombs, as antitank weapons. Preliminary US data from the October 1973 Middle East war indicate that the Israelis had success with both the Walleye and Maverick against Soviet tanks. (Soviet commentary on US precision-guided munitions is discussed in greater detail in the section on Tactical Air Forces and Air Transport, page 53.)

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Soviet military commentators believe that mine-fields "continue to be effective weapons on the battlefield." Authors in *Red Star* and *Military Herald* have mentioned US and FRG efforts to improve the ease and speed with which mines can be laid and US efforts to improve remote-control detonation. Concern for the problems of minefields is also reflected in Soviet efforts to improve mine-clearing equipment and in the greater deployment of such equipment in Soviet forces than in NATO forces.

Helicopter Gunships in Antitank Role. Soviet military officers and commentators have clearly been impressed by the US capability to combine helicopters and missiles into an antitank system. This ability has been attributed in the open military press to improvements in both the characteristics of second-generation antitank missiles and the combat capabilities of helicopter gunships. Classified articles have indicated that this capability "complicates" the Soviet ability to destroy enemy antitank forces during an offensive. These sources note that US helicopters have demonstrated their ability to take advantage of terrain cover, lie in wait, and attack by surprise. Open sources have noted the effectiveness of the AH-1G Huey Cobra helicopter armed with 20mm guns and 70mm rockets against Soviet medium and amphibious tanks in Laos. A classified article, in a highly favorable evaluation of operations by Iroquois helicopter gunships in Vietnam, noted that they were armed with missiles. Both open and classified sources observe that the effectiveness of US antitank helicopters has been greatly improved by modifying them to carry the TOW missile.

Soviet military planners are clearly interested in ascertaining the ways in which helicopter-borne antitank weapons could be used against their armored forces in Europe. A *Red Star* commentator has called attention to US tests in which TOW missiles fired from helicopters demonstrated great accuracy. Open and classified sources have noted that helicopters are more maneuverable than tanks, and one *Military Herald* article cited the success of US helicopter activity against tanks in Laos as evidence that air-

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mobile forces could be used successfully for that purpose. Colonel M. Belov, a prolific Soviet writer on US experience with airmobile operations, has cited US and FRG computer simulations portraying the effectiveness of helicopters against tanks. Belov has even asserted that helicopters were superior to tanks as combat vehicles. Other commentators have noted the modernization of US helicopter gunships in Europe to use TOWs and US efforts to organize and train airmobile antitank units in Europe.

Soviet general officers informally expressed consternation with the successes of US helicopter-launched guided missiles in Vietnam.

Armored Personnel Carriers

Open and classified Soviet military publications have rated the M113 armored personnel carrier favorably. An older classified article called attention to its size and weight and listed the M113 as one of the "more successful" foreign APCs. In the open press, Rotmistrov has cited its successful use in Vietnam, especially for combat operations in swampy and mountainous terrain, and has referred to its "comparatively good combat qualities." Rotmistrov also noted that several modifications were made in the vehicle for use in Vietnam, including the installation of two additional 7.62mm machine guns, improvements in its off-road traveling capability, and strengthening of armor along the bottom and sides of the body. A more recent classified article has noted, however, that the M113's design does not permit infantrymen traveling within the vehicle to fire on enemy forces.

Nuclear Weapons

Commentators in both classified and open military publications have consistently claimed that the United States has approximately 7,000 nuclear warheads stored in Western Europe, with the bulk of them located in

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West Germany. Other classified Soviet material concedes to NATO a substantial advantage in numbers of tactical nuclear weapons available for use in Central Europe. Soviet writers have claimed that the US is currently engaged in efforts both to increase the quantity and to improve the quality of its tactical nuclear weapons and their delivery systems. US efforts to design smaller and lighter tactical nuclear warheads have been stressed. One classified article has stated that the US already has the nuclear material needed to do this and is currently directing its research efforts to development of new 155mm and 175mm atomic shells.

Warsaw Pact critiques of NATO exercises indicate that the Pact expects NATO's earliest use of nuclear weapons to be selective. It is also noted however, that these strikes would be insufficient and that NATO would soon be forced to shift to massive nuclear strikes to stem a Pact breakthrough.

(Soviet commentary on the capabilities of US tactical nuclear delivery systems is reviewed in the sections on Artillery, page 26, Tactical Surface-to-Surface Missiles, below, and Fighter Aircraft, page 55.)

Tactical Surface-to-Surface Missiles

Soviet commentators have closely followed US work on tactical surface-to-surface missiles. Open and classified articles have cited the obsolescence of the Honest John and Sergeant missiles and have called attention to plans to replace them with the Lance missile. Military writers have been impressed by the lighter weight and greater mobility of the Lance, and have noted that it can be transported by airplane and helicopter and be delivered by parachute.

Soviet authors have also been impressed by the mobility of the Pershing 1A. They have indicated that the placement of its components on wheeled, rather than tracked, vehicles increases its cross-country mobility. A classified source claimed that

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the Pershing could undertake a significant portion of the missions now assigned to tactical air forces.

General assessments of US missiles in the open press have been favorable. A *Red Star* commentator in 1970, for example, noted that "the combat capabilities of (US) guided missiles have been considerably improved in recent years." A more critical, classified article noted that US tactical missiles did "not meet modern requirements," an assessment which suggests that the Soviets had evaluated some systems against an implied model of satisfactory performance.

Classified military commentaries have examined US procedures and reaction times associated with the firing of tactical nuclear missiles. In 1970, Soviet writers claimed that the high state of combat readiness continually maintained for these weapons would hamper Soviet discovery of US launch preparations. Nevertheless, these military authors argued that because of the time-consuming nature of the NATO release process, Soviet intelligence would probably receive timely warning of a decision to employ nuclear weapons.

Military writers have carefully studied the launch preparation times required for Pershing, Pershing 1A, and Sergeant missiles. Using these to establish norms, they have outlined new launch procedures for Soviet tactical missile units which could, if accepted, reduce launch preparation times below those of the US and "significantly" increase the chances of destroying US tactical missiles before they are launched.

Other recent classified Soviet material indicates that both the military and military-industrial components of the national security community have demonstrated great interest in discovering US safety procedures and the capabilities of safety equipment associated with the prevention of unauthorized or accidental use of nuclear weapons. In spite of redundancy and automation, Soviet commentators in the classified press have described their own command and

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control systems as subject to breakdown, and some writers have expressed concern about the possibility of unauthorized firings of nuclear systems.

Reconnaissance and ECM Equipment

Both open and classified Soviet military writings have shown respect for US reconnaissance capabilities. Classified sources have cited the excellent ability of the US to discover both troop locations and operational objectives by monitoring communications from Soviet command posts. Writers in *Starshina-Serzhant* and *Red Star* have rated highly the performance of the AN/PPS-4 ground radar set in Vietnam and the effectiveness of the AN/MPQ-4A for quickly detecting enemy firing positions. A classified article has noted that the latter device cannot scan in all directions. Nevertheless, a *Red Star* commentator has observed that without adequate radar deception measures, it is impossible to conceal troop and equipment movements from these systems.

Soviet commentators in both the open and classified military press have carefully reviewed the capabilities of US sensor systems developed during the Vietnam war. They have noted that the jungle conditions of Vietnam severely compromised the usefulness of infrared reconnaissance systems and stimulated the development of new equipment to remedy this deficiency. Writers in *Starshina-Serzhant* and *Red Star* have described the White Igloo system of seismic sensors and transmitters in Vietnam as a new effort of the US to gain adequate warning of the presence of enemy forces. These commentators claimed that the effectiveness of the system was inhibited by the inability of the seismic sensors to distinguish between legitimate and illegitimate targets, a deficiency which can lead to the successful use of false targets by enemy forces. The system was also criticized for its reliance on airborne relay stations, which were vulnerable to antiaircraft weapons.

Classified writings have acknowledged the capability of US ECM equipment to jam both Soviet commun-

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cation networks and radar stations used for reconnaissance. They have stressed US efforts to prepare its forces for electronic warfare and have claimed that Warsaw Pact forces have not reached a comparable level of competence.

Air Mobility

Soviet writers in both the classified and open military press have reviewed the technical capabilities and performance of US helicopter gunships and transport helicopters and the tactics of US airmobile operations. Although some authors have noted deficiencies in equipment and problems in the US airmobile experience, other writers, including Colonel M. Belov, have written highly favorable evaluations. In classified military writings, some commentators have cited successful US helicopter operations in Vietnam to support arguments for increased development and use of helicopters by the Soviet Armed Forces. Soviet military authors have clearly been impressed by the rapid development, technical characteristics, and combat performance of airmobile systems, as well as by the new tactics which they permit ground forces to adopt.

Helicopter Gunships. Soviet military writers have been greatly impressed with the performance of US helicopter gunships. Three classified articles have cited US Vietnam experience as evidence that suitably armed helicopters can provide adequate fire support for ground forces. In open publications, Soviet commentators have closely followed US development of helicopter gunships and have shown definite interest in ascertaining the extent to which these aircraft would improve the performance of American ground forces.

Colonel M. Belov, for example, in numerous articles in *Red Star* and *Military Herald* between 1967 and 1973 called attention to the mobility and the quick concentration of accurate and dense firepower which the employment of helicopter gunships gave to US forces on Indochina battlefields. He has

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specifically cited the heavy firepower of the UH-1B Iroquois, the "rapid development" of the AH-1G Huey Cobra with its improved armament, and the fact that the Cobra's capacity to carry missiles, its "most effective weapon," has been increased. Writers in the open and classified press have repeatedly cited the high speed, good maneuverability, powerful and diversified weapons, and increased armor protection against ground fire as characteristics which make current US helicopter gunships a formidable weapon system. To Belov, commenting in a 1973 *Military Herald* on aircraft employed by foreign infantry, "it is clear that combat helicopters excel tanks in terms of maneuverability and effective fire."

Transport and Reconnaissance Helicopters. Soviet military writers have followed US work on military transport and reconnaissance helicopters. Both open and classified commentaries have repeatedly acknowledged the effectiveness of their performance in Vietnam. One classified article suggested, however, that their relative invulnerability resulted from operation in a low-intensity combat environment. In the open press, several commentators have stressed the vulnerability of transport helicopters to ground fire, but a *Red Star* writer in 1970 noted that the SN-46 and SN-47 helicopters were playing a "significant" role in the US Vietnam war effort, citing the 1968 evacuation of 1,500 men from a Vietnamese air base which had been surrounded by insurgent forces. Colonel Belov has noted the vulnerability of the CH-47 Chinook, but has tempered his criticism by calling attention to the strengthening of defensive armament on the CH-47C. In a 1972 discussion of US exercises in transporting troops and materials from the US to combat areas (Reforger III, Freedom Vault) Belov stated that Chinooks were "widely used" and could transport all standard US cargo.

It is apparent that the Soviets have been most interested in US efforts to improve helicopter lift and cargo-carrying capacity. A recent classified article has cited the frequent shifting of 105mm artillery by helicopter in Vietnam (though elsewhere, writers have noted that these weapons were specially

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designed to be small and light), and a 1970 *Red Star* commentary cited artillery raids in Vietnam in which 155mm howitzers were frequently and quickly transported between combat areas on transport helicopters. Colonel Belov has noted the installation of a more powerful engine on some Chinooks to increase their cargo-carrying capacity and has cited the use of CH-54A Skycranes, with their greater strength, in Vietnam to move freight and heavy military equipment. He has also commented on US plans to develop transport helicopters with a capability to carry even heavier armor and weapon systems for ground and airmobile forces. Authors in both the open and classified military press have stated that US accomplishments in the field of transport helicopters have significantly altered ground force combat tactics.

Colonel Belov has commented in *Red Star* on US development of small helicopters as reconnaissance vehicles to fill the gap between ground-based and aircraft reconnaissance. Although noting their high vulnerability to ground fire, Belov has cited the "extreme effectiveness" of the OH-6A Pawnee and the OH-58A Kiowa in performing numerous functions under combat conditions in Vietnam. He referred to attempts to improve the armor protection on the Kiowa over that of the earlier Pawnee and wrote in a 1972 *Red Star* article that the Kiowa met "modern requirements" for a reconnaissance helicopter.

Tactics and Organization. Soviet military planners and writers have been impressed by US airmobile and fire support helicopter operations.

Soviet general officers have repeatedly acknowledged the very satisfactory performance of these units in Vietnam. In classified articles, military commentators have suggested that this experience with "qualitatively new units" has begun to cause "definite changes in traditional techniques of warfare." Many references have been made in the classified press to the ease with which US troops and helicopter gunships could be quickly concentrated to carry out a task behind enemy lines and then dispersed. Attention has been given to the frequency

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and rapidity with which artillery and gun crews in Vietnam could be shifted. Colonel Belov and other writers in the open press have frequently noted both the "qualitatively new tactical mobility" and the increased offensive capability which helicopters have given to US ground forces. Some open press articles have referred to US helicopters as exceptionally mobile airborne armored personnel carriers, and one classified article has claimed that their existence may preclude the need for development of new APCs or trucks, which could offer only marginal improvements in mobility. Soviet respect for the US airmobile experience is reflected in Colonel Belov's suggestion that changes in tactics and strategy may be coming that will transcend those brought about by the motorization and mechanization of the ground forces in the Thirties.

Soviet commentators have frequently noted that the success of US airmobile operations in Vietnam resulted primarily from the success with which the threat from ground fire was overcome and the ease with which units were structured and trained to take full advantage of helicopter capabilities.

[] a Soviet general suggested that helicopter operations in a more hostile environment--with substantially more enemy aircraft, surface-to-air missiles, and antiaircraft artillery--would produce results significantly more unfavorable to the US than those observed in a "jungle war." Similar sentiments have been echoed by Soviet general officers

In articles which commented on the effects of heavy ground fire on helicopters, military writers have noted that when US planning in advance of operations was meticulous and when tactical air cover for helicopter units was adequate, airmobile and fire support units effectively carried out their assigned tasks. A 1970 *Red Star* article referred to the careful planning which preceded attacks by helicopter-transported artillery in Vietnam and to the successful evacuation of personnel from a besieged air base by helicopters with tactical fighter cover. A 1973

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Military Herald article cited the US raid against the Son Tay prisoner-of-war camp as an impressive example of a coordinated helicopter - tactical air combined operation for a deep-penetration raid.

When coordination between army air and tactical air units was poor or tactical air cover was inadequate, according to two 1973 *Red Star* articles on US Army air operations in Laos, US helicopter losses in the face of intense ground fire were severe. A recent classified commentary has reiterated the point that US Army helicopters could maintain "relative invulnerability" if they would operate at low altitudes at night and with adequate air cover. One of the 1973 *Red Star* articles cited above called attention to new tactical maneuvers employed by US helicopters in Laos to overcome insurgent antiaircraft fire.

Many articles have noted US attempts to organize troop units to make the most effective use of helicopters. Colonel Belov believes that the most significant aspect of the US experience in Vietnam has been the formation of airmobile divisions, units uniquely adapted for movement by helicopter into combat areas. He has also cited US computer simulations which showed that the Vietnam airmobile experience could be applied to any difficult theater of combat.

Some classified commentaries, however, have noted that the units employed in combat in Vietnam did not carry adequate firepower, especially anti-tank weapons, to engage in a successful position defense. These articles have questioned whether the airmobile concept could be transferred in its current state to Europe. General officers have informally suggested that such units would be decimated if landed behind enemy lines in Central Europe. A recent classified article claimed that US airmobile divisions were "not adapted for conducting combat against a strong enemy in Central Europe."

Nevertheless, several open and classified articles have noted that conditions of nuclear war would bear some similarities to those of the Vietnam war (no

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clear battle lines, forces dispersed, swift and frequent troop shifts over difficult terrain, battles to destroy enemy strength rather than to seize territory) and have called attention to continuing US and NATO experiments in airmobile troop organization.

Training and Professionalism

The Soviet military press has frequently alleged that social injustices in the US are reflected in the Armed Forces, citing racial tensions and incidents between black and white soldiers; protests and desertions among officers and enlisted men during the Vietnam war; and drug abuse, low morale, and poor discipline among US troops stationed overseas. These themes have been stressed in Soviet Armed Forces' indoctrination lectures.

[redacted] such assertions tend to be discounted by Soviet soldiers either because the supporting evidence, when offered, does not appear credible, or because Soviet soldiers realize that they, too, are often guilty of indiscipline.

Soviet military sources have commented respectfully on the training and professional expertise of many US units.

[redacted] Soviet general officers seemed impressed by US airborne forces to such a degree [redacted] that the officers over-rated these units. [redacted] the Soviets had a high opinion of US Special Forces.

[redacted] the Soviet military gave Green Beret units high evaluations and established special self-defense training for their own paratroops patterned after US Special Forces training.

Both the open and classified military press have noted the creditable performance of US airmobile divisions in Vietnam. Colonel M. Belov observed that organization and training problems compromised the effectiveness of certain units when they were first used, but in both his open-source and classified commentaries he expressed admiration for the way in which

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these units developed and employed tactics prompted by the unique jungle conditions. Writers have also been impressed by the ability of these units to adopt new tactics in response to the improvements in insurgent combat capabilities.

[redacted] Soviet general officers expressed respect for the training and professionalism of US forces and were impressed by their combat experience in Vietnam. [redacted] Marshal Malinovskiy carefully noted that he did not imply a low opinion of the competence of the US Army when he criticized the US for waging a "limited war" in Vietnam. [redacted]

[redacted] the general feeling [redacted] was that statements about low morale in the US Army by Soviet officials were good propaganda weapons, but the US Army had shown by its performance in Vietnam that "it could be an effective weapon of the US ruling circles."

Soviet commentary on the US volunteer army concept has been limited and inconclusive, although some evaluations can be discerned. Soviet writers have been especially alert to the efforts of the Defense Department to make long-term careers in the volunteer army more attractive to highly qualified noncommissioned specialists. In 1973, *Military Herald* called attention to US problems of "replenishing human reserves" while a classified military publication noted Defense Department expectations that the volunteer army would raise the "technical and professional level of enlisted personnel and noncommissioned officers."

Some Soviet commentators have examined Defense Department arguments that the reorganized units of a volunteer army would greatly increase the combat efficiency and the flexibility of US military forces. A classified article noted that although the size of the army and the number of divisions would be reduced, the

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quality of US armaments and the army's combat efficiency would "sharply improve." In a 1972 book published by the Institute of World Economics and International Relations, retired Major General Nestor Solodovnik asserted erroneously that reductions in manpower associated with the all-volunteer army would result in savings that could be used for equipment. He added that small, well-equipped volunteer forces would greatly improve the US capability to respond to rapidly changing situations throughout the world.

Negative Soviet assessments of the volunteer army have noted that recruitment quotas have not been fulfilled, that the quality of recruits joining the Army has fallen, and that the presence of a disproportionately high number of black enlisted men has increased social tensions within the Army. A 1974 article in *Red Star* presented a highly critical picture of the US Army's operation since the transition to an all-volunteer force. An author in a 1973 issue of the monthly *Journal of Military History* cited Representative F. Edward Hebert's doubts that the US Army could be adequately staffed on a voluntary basis.

Naval Forces

Soviet military commentators have shown great respect for the sophisticated technology of new US ships and weapon systems. They have monitored US research and development efforts and have stressed the improvements in systems brought about by the US experience in Vietnam. [redacted] instructors at the Military Diplomatic Academy in Moscow have described the Soviet Navy as lagging the US Navy in many classes of ships, particularly aircraft carriers.

Military press articles generally reflect admiration for the Vietnam combat experience of the US Navy. Writers have noted that for almost all attack carriers, many other surface combatants, and a large portion of

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the US amphibious forces Vietnam was a training ground. They have cited the opportunities afforded by the war for testing equipment under combat conditions, gaining experience in logistical resupply over long distances, and developing tactics.

Soviet military authors have recognized the accomplishments of well trained units. They have cited the meticulous preparation of US amphibious forces and the success of vertical envelopment techniques during the Vietnam war.

Ships and Equipment

Aircraft Carriers. Soviet military commentators have frequently asserted that attack carriers constitute the most formidable component of US general purpose forces. In *Red Star*, the monthly *Naval Digest*, and various monographs writers have often cited the timely deployment of US carrier strike forces during military or political crises, even observing that crises are rarely resolved without the appearance of these forces. They have admired the ability of attack carriers to carry out global police functions.

Soviet commentators clearly have been impressed by the operational flexibility of attack carriers. Classified articles have noted their capability to deliver attacks with both conventional and nuclear weapons. Unclassified writings have cited their maneuverability and their ability to concentrate large numbers of aircraft anywhere on the seas. Some articles have noted the saving in transit time which the US achieves by keeping carriers permanently on station.

Unclassified writings have cited the endurance of these ships. The ability of attack carriers to undertake sustained operations off the coast of Vietnam for periods of 25 to 30 days, at great distances from their bases, has been cited with respect. The endurance record of the nuclear-powered Enterprise has been specifically noted.

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Military writers have referred to the great fire-power wielded by these carriers, one author noting the many combat sorties flown against North Vietnam by aircraft operating from carriers on Yankee Station.

Commentators have noted the steady increase in the size and displacement of attack carriers. The high speeds and longer range provided by nuclear propulsion plants have frequently been cited as their best defense against submarine attack. The Nimitz is expected by Soviet writers to be a "highly potent," though extremely costly, ship when completed. Its size is seen as straining the capacity of the shipyard building it.

Soviet authors have noted US efforts to improve the capability of attack carriers to withstand attack and damage. A classified article noted both the difficulty of destroying attack carriers without the use of nuclear weapons and the relatively large number of conventionally armed missiles that would be required to destroy carrier escorts. Nevertheless, a *Red Star* commentator has reiterated the traditional Soviet claim regarding the vulnerability of these ships and suggested that they may soon become as obsolete as battleships. A recent monograph noted the susceptibility of carriers to attack, especially when constrained from maneuvering because of damage or flight operations.

In balancing the pros and cons, the Soviets have chosen not to follow the Western example of building a naval force centered on large attack carriers. They are, however, currently outfitting their first "aircraft carrier"--the Kiev--which is expected to be operational by 1976, but Soviet naval spokesmen have consistently stated that this new ship is not similar to Western carriers in either appearance or mission. They have stressed that its primary mission will be antisubmarine warfare. Although the Kiev is as large as early Western carriers, it has neither the catapults nor the arresting gear necessary for flight operations by conventional aircraft. Instead, the ship is expected to carry 10 to 15 V/STOL aircraft and 20 to 25 helictopers. In terms of its

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likely capabilities and missions, the Kiev appears to be an evolutionary product of the concepts which led to the earlier Moskva class helicopter cruisers rather than a portent of a revolutionary change in Soviet naval strategy.

(Soviet assessments of the US naval air arm are reviewed in the section on Tactical Air Forces and Air Transport, page 53.)

Frigates, Destroyers, Destroyer Escorts. Commentators in both the open and classified military press have shown respect for the structural strength and technology built into new US surface ships. A classified commentary has claimed that major US combatants might withstand up to four direct hits by conventionally armed guided missiles before sinking. These writers have also referred to improvements in armament and maneuverability, increases in range and endurance, and advances in propulsion technology.

A classified commentary states that the US surface fleet adequately maintains its capability to perform a broad range of combat missions. Other Soviet writings have noted that most US destroyers date from World War II and have been modernized through the fleet rehabilitation and modernization program (FRAM). An author in *Naval Digest*, however, has cited frequent accidents and equipment failures in the Sixth Fleet and claimed that these mishaps were caused primarily by the age of the ships and the low standard of repair work.

Regarding new destroyers, one author has observed that the Charles Francis Adams class embodies modern combat characteristics, specifically citing its anti-aircraft and antisubmarine missile armament. A *Red Star* commentator was less generous in his evaluation of the newer Spruance class. According to this author, its speed is no greater than contemporary warships and its armaments are not substantially advanced. He labeled its sonar "ineffective" and its antisubmarine warfare weapons "obsolete."

A writer in *Naval Digest* has cited the "powerful antisubmarine warfare armament" of the Knox class of

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destroyer escorts. He criticized, however, the large displacement and poor staying power of this class, and its single screw, which limits the ability to maneuver.

Soviet commentators have referred to the extensive antiaircraft and antisubmarine armament on US nuclear-powered frigates. A *Red Star* writer has noted that this weaponry has brought about "a substantial increase" in their displacement. A commentator in *Naval Digest* noted their high cost and claimed that small multipurpose, nonnuclear escort ships would fulfill the mission of attack carrier defense more efficiently. On the other hand, a 1974 *Red Star* article noted that the cost of equipping surface vessels with nuclear power plants has declined significantly in the last few years. The writer then cited the greater ability of nuclear frigates to protect nuclear attack carriers because of their improved mobility, speed, and range. There is presently no evidence, however, that the Soviet Navy is planning to build nuclear-powered surface ships.

Small Combatants. Commentators have noted that the US used gunboats in Vietnam extensively to blockade the coast, to patrol inland waterways, and to disembark landing parties. They have cited the use of three air-cushion vehicles in Vietnam and noted with favor that they could transport up to 20 soldiers where deep-draft boats could not operate. This reaction, however, has not been reflected in Soviet air-cushion vehicle programs. The USSR has produced approximately 20 air-cushion vehicles of several types for military use, but none has been widely employed.

Logistic Support Ships. Writers in both the open and classified press have shown respect for the ability of the US to move supplies during the Vietnam war. Classified material has cited the movement of 95 percent of supplies and 65 percent of personnel to Vietnam by sea, and both classified and unclassified articles have said that the extensive US sea resupply effort has shown the continuing significance of maritime shipping during hostilities. One classified article cites developments in containerization

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techniques and anticipates great increases in the carrying capacity of containers and improvements in transshipping and unloading from them.

Amphibious Ships. Soviet military authors have been critical of the technical capabilities of US amphibious ships employed during the Vietnam war. A classified article has claimed that the majority of these ships were obsolete. Both open and classified commentaries have called attention to their inadequate speed, their poor maneuverability, the constraints imposed by the need to transship supplies and troops, and the relatively long time required for unloading troops and equipment from these ships.

Soviet commentators have noted, however, that the US is developing an entire range of new amphibious combatants to correct these deficiencies. They have cited the work under way on the LHA general purpose assault ship and have noted that it will be an improvement over "narrowly specialized" amphibious assault ships and landing docks, which, according to one author, have proved inadequate to support even small, mobile marine units.

Soviet writers have called attention to development work on the LFS, a special inshore fire support ship. They have claimed that US cruisers and destroyers did not serve well as offshore fire support ships during the Vietnam war, citing their lack of missile launchers for fire against shore targets, their comparatively low firepower in guns, and the deep draft of cruisers, preventing them from approaching close to shore. These authors have noted that 127mm rocket launchers mounted on medium landing ships (LSM) proved "most effective" in providing close fire support for amphibious landing forces in Vietnam.

Authors in the open and classified press have followed the research and development work on the SK-10 air-cushion landing vehicle. They have noted the low speed and poor maneuverability of the LCU, LCM, LCPL, and LCVP landing craft and have reported that the speed and technical capabilities of the new vessel will "substantially reduce" its vulnerability

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to attack. Its greater speed, they observe, will permit transports to off-load troops and supplies even farther from the coast, reducing their vulnerability to discovery and attack. The US desire, according to a *Naval Digest* commentator, is to give this vessel more than sufficient speed to push through an enemy shore-defense firing zone.

Submarines. Soviet military commentators have followed with interest the efforts of the US to create a class of submarines capable of combating other submarines. They have noted that the US is specializing in the building of nuclear-powered attack submarines and is leaving the construction of diesel submarines to its NATO allies. A classified article has termed US efforts in nuclear submarine construction "intensive," and a *Red Star* writer in 1974 has cited the almost completed Sturgeon class construction program, the newly begun Los Angeles class building program, and plans for construction of yet another class of nuclear attack submarines as examples of the great effort undertaken by the US in this area.

Soviet authors have emphasized US efforts to increase the speed of attack submarines. A classified article stressed that the US goal is to design a combatant fast enough to engage both ballistic missile submarines and surface ships. A military commentator in a 1972 issue of the monthly *Science and Life* claimed erroneously that the 35-knot speed of current US attack submarines permits them "easily" to overtake slower missile-carrying submarines. A more recent commentary in *Red Star* has noted with respect the announced submerged speed and depth capabilities of the Los Angeles class.

Soviet writers have also cited the great cruising range, endurance, and relative noiselessness of US attack submarines. One commentator has claimed that this last factor permits attack submarines to use their hydroacoustical devices with greater accuracy, though he also noted that current systems can still be seriously compromised by false targets and signals. Another commentator reported that improved detection

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devices are installed on the Los Angeles class, but a classified article has claimed that despite such changes Soviet submarines will remain basically invulnerable to these devices.

Recent Soviet submarine construction programs reflect the same interest in high speed and deep diving capabilities as has been noted in Soviet statements about US submarines. Soviet submarines, however, are relatively noisy and there are no indications that the Soviets have undertaken a submarine quieting program.

Ordnance

Mines. Soviet writers have asserted that mine warfare permits "prolonged and continuous action against an enemy." They appear to respect the sophistication of influence mines such as the MK-52 and the MK-56 and have noted that these weapons are difficult to sweep.

Torpedoes. Commentators in *Naval Digest* have asserted in general terms that some older US torpedoes are deficient in tactical characteristics. They have claimed that the shortness of US torpedo tubes limits the capabilities of the weapons and have criticized US designs for not attaining greater depth and higher speed. A writer in the monthly *Military Knowledge* has noted that the low speed of conventional torpedoes precludes their use against modern submarines and the existence of modern cruise missiles obviates the need for their use against surface ships.

Writers have nevertheless noted US efforts to increase the target-closing speed, accuracy, and warhead charge of current torpedoes. The MK-45 has been cited as a weapon whose atomic warhead more than compensates for any deficiencies in accuracy caused by the lack of homing devices. The MK-46 has been noted as the "basic armament" of US ASW aircraft and surface ships. Its homing devices are said to aid significantly in ASW warfare, although one commentator has labeled it "obsolete."

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An author in *Military Knowledge* has cited the combat capabilities of the MK-48 torpedo, calling attention to its "significantly higher speed," greater depth of operation, and increased range over that of the MK-46. The writer especially respected its wire guidance system for permitting both immediate firing when a target was detected and course correction while the torpedo was en route. A commentator in *Naval Digest*, however, has alleged that its relatively small warhead lowers its effectiveness against surface targets.

Cruise Missiles. A Soviet commentator in the classified military press, noting that cruise missiles enhance the capability of warships to fight hostile vessels, suggested that the US Navy might be interested in such an improvement for its surface fleet.

A 1974 *Red Star* commentary cited plans by the US for its extensive deployment.

Antisubmarine Warfare

Soviet commentators generally recognize that despite the rapid development in recent years of ASW forces and weapons, modern nuclear submarines retain much of their ability to operate undetected. Nevertheless, they have called attention to the increasing sophistication of US ASW systems as evidence that research in the field has been marked by "a rather high rate of progress."

The Soviets have commented only rarely on the capabilities of US nuclear-powered torpedo attack submarines to conduct ASW activities such as tracing or open search. The scarcity of comment probably reflects the sensitivity of such information within the USSR.

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Military writers have noted the major ASW role played by aircraft. They have claimed, however, that the US carrier-based S-2 is ineffective in searching for submarines because it cannot carry heavy, modern detection gear. They have also noted that an ASW aircraft with improved capabilities, the S-3, is under development. A 1974 *Red Star* commentary reported that the S-3 will be able to monitor an area substantially larger than that covered by the S-2. The writer deferred judgment on the P-3 shore-based aircraft, stating that it was a "relatively new" addition to the US Navy.

Military authors have stressed the increasing role of helicopters as a component of ASW forces, observing that they have extended the range and improved the effectiveness of shipboard ASW techniques. ASW helicopters, according to these authors, have good speed and maneuverability, especially in comparison with submarines, and can quickly search "considerable" areas. The SH-3-D Sea King has been rated highly in *Naval Digest* for its flight characteristics and its electronic equipment. Military writers have noted, however, that such helicopters are vulnerable to antiaircraft fire and their operations limited by their dependence on shipborne navigational equipment.

The Subroc missile has been called a "very effective" antisubmarine weapon by a military commentator in *Science and Life*. He emphasized that its range exceeds that of other ASW weapons. However, a *Naval Digest* writer alleged that the lack of a conventional warhead is a serious deficiency of the system.

The Asroc antisubmarine missile-torpedo system has been compared unfavorably with the Australian Ikara by a writer in *Naval Digest* who claimed that the missile cannot be controlled in its flight phase and that it cannot cope with the speed of contemporary submarines. A commentator in *Military Knowledge*, however, cited the Asroc system, in a discussion of the development of missiles with torpedo warheads, as a successful means of countering modern high-speed submarines.

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Soviet commentators have said that the speed of attack carriers remains their best protection against submarines, but they have noted continuing US efforts to strengthen ASW capabilities by providing carriers with specially equipped aircraft and helicopters.

Soviet commentators have noted the capabilities of US seabed antisubmarine reconnaissance systems. A military writer in *Science and Life* cited their "rather great reliability" and V. M. Kulish, formerly a General Staff officer and recently a member of the Institute of World Economics and International Relations, has noted in a recent monograph the "considerable success" which the US has achieved with them. Informal comments made in 1973 by Georgiy Arbatov, the director of the USA Institute in Moscow, have suggested some concern for the vulnerability of Soviet submarines in the North Atlantic area where these detection systems are deployed. The Soviets have not, however, attempted to deploy a SOSUS-type undersea surveillance system of their own.

Tactics

Amphibious Operations. Numerous articles in both the open and classified military press have noted the emphasis placed on the development of US amphibious forces. Unclassified commentaries have stressed the utility of these forces for limited war and military interventions. A classified article implied their usefulness for a European war by suggesting that flank and rear assaults by amphibious forces could be used to ensure a high rate of advance for operations in coastal areas.

Commentators have referred to the "meticulous training" of US amphibious forces to compensate for the deficiencies of current vessels. They have cited both annual training exercises involving all aspects of landings and the practical combat experience which US amphibious forces have gained since World War II. A *Red Star* commentator has claimed that in two important characteristics, speed of transfer and speed

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of debarkation, US amphibious operations lag present-day requirements.

Military authors have admired US techniques of vertical envelopment, citing the advantages of surprise, swiftness, and applicability to hard-to-reach areas and a nuclear environment.

Mine Warfare. [] a Soviet admiral evaluated highly the May 1972 US mining of Haiphong and other North Vietnamese ports. From a naval point of view, the admiral reportedly said, the operation was "masterfully done." An article in *Naval Digest* referred to rehearsals for this operation conducted by the Navy off the coast of San Diego.

Commentators in *Red Star* and *Naval Digest* have noted deployment of the Sikorsky RH-53-D, the first helicopter designed specifically for minesweeping. One *Naval Digest* writer cited the transfer of four helicopters in four days by C-5A transport from Charleston, South Carolina to the Sixth Fleet, contrasting this with the 14 days required to deploy surface minesweepers. Commentators have observed, however, that this helicopter cannot sweep deepwater mines and cannot operate in poor weather. Military authors have also noted the use of the SH-3-D Sea King ASW helicopter for minelaying and minesweeping.

Tactical Air Forces and Air Transport

Commentary in the open and restricted military press [] indicate a high Soviet regard for US tactical air forces and air transport. Several articles in the monthly *Aviation and Cosmonautics*, *Red Star*, and classified military publications have noted extensive US programs to modernize its aircraft and associated equipment. The Soviets have repeatedly cited these development efforts, the substantial accomplishments of US

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aviation during the Vietnam war, and the critical role assigned to tactical air forces in US military doctrine as evidence of the prowess of American tactical air power.

Soviet pilots believe that US aviation is clearly the best in NATO and that American aircraft are on balance superior to their Soviet counterparts.

however, that Soviet military intelligence personnel were taught that US and Soviet aviation were "on a par."

a detailed comparison of the capabilities of Soviet and US tactical aircraft. these evaluations are based upon personal experience with Soviet aircraft and careful study of information on American planes available in Soviet intelligence publications.

characterized US tactical aircraft as generally superior to those of the Soviets in armament-carrying capacity, range, engine power, missile weaponry, and especially electronic equipment. praised the skills of US pilots, linking their high competence both to the experience provided by combat in Vietnam and to flight training programs

"more realistic" than those of the Soviets.

characterized Soviet and American aircraft as largely equal in speed and altitude capabilities, but gave Soviet aircraft an edge in cannon armaments and maneuverability.

Articles in the classified and open military press have frequently stated this last point, claiming distinct maneuvering advantages for Soviet fighters. Although not drawing explicit comparisons with Soviet aircraft, they have also praised the all-weather capabilities of US tactical aircraft but have criticized the vulnerability to enemy fire which they exhibited during the Vietnam war.

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The Soviets appear to be impressed by US long- and short-haul air transport capabilities. Articles in the classified and open military press have cited peacetime airlift exercises--such as Big Lift, Re-forger, Bold Shot, Focus Retina, and Brass Strike-- and quick-reaction movements during international crises as demonstrations of logistic lift capabilities.

US transport activity in support of the Vietnam war has been frequently discussed. A 1970 article in *Aviation and Cosmonautics* noted the rapid air movement of the 101st Airborne Division with all of its associated equipment from the US to Vietnam and the air evacuation of wounded American personnel to stateside hospitals aboard C-141s in 17 hours. Open and restricted press accounts of various US tactical airlift operations in the Indochina theater convey a similar impression of Soviet respect for US air transport capabilities.

Weapon Systems

Fighter Aircraft. The American aircraft most frequently discussed by the Soviets has been the F-4 Phantom. [redacted] the F-4 has been described within the Ministry of Defense as the "world's most perfect aircraft." Towards the close of the Vietnam war the KGB and GRU engaged in extensive, and joint, efforts to gather all available technical data on the F-4.

[redacted] unanimously rated the F-4 as "exceptional" and superior to any Soviet fighter, although noting that it had shortcomings in horizontal maneuverability. Such assessments, however, probably reflect comparisons with Soviet aircraft, up through the MIG-21, [redacted]

[redacted] The most modern Soviet fighter, the MIG-23, although first displayed in 1967, has been deployed in large numbers only since mid-1972. [redacted]

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Soviet commentators in the open press have pointed out deficiencies of the F-4. In 1972, *Aviation and Cosmonautics* reprinted an American article discussing undesirable spin characteristics displayed by the Phantom. Other articles in the same journal have stated that the F-4's performance in Vietnam revealed its poor horizontal maneuverability when fully loaded.

Articles in the Soviet restricted and open press have praised the all-weather, day-night, and radar targeting capabilities of the F-105 fighter-bomber and the A-6 carrier-based attack aircraft. The A-6 has been complimented for its endurance, maneuverability, and excellent close air support capabilities in press accounts of its performance in Vietnam. These same sources have rated the F-105 highly for its payload capacity but criticized it as vulnerable and having poor maneuverability, particularly at low altitude. The F-5 fighter bomber, which is similar to the widely deployed MIG-21, has been praised for its survivability, high acceleration, maneuverability, and low cost but rated poor in endurance and range. The Soviets have written little about the F-111, beyond noting that "serious design defects" were revealed during its use in Vietnam, or about the A-7, which has been said to have "proved out well in combat."

The British-developed Harrier vertical takeoff and landing (VTOL) aircraft being procured by the US Marine Corps has drawn varied Soviet comments. In December 1971, Admiral Gorshkov, commander in chief of the Soviet Navy, told [redacted]

[redacted] that the Soviets were monitoring the Western VTOL program and noted that "both the Americans and British are ahead of the Soviet Union in this area." [redacted] the US as "more successful" in acquiring a VTOL capability. A classified Soviet article on American naval tactics praised the flexibility of VTOL aircraft as permitting air support for limited US naval operations without the presence of a large attack carrier. This evaluation has been disputed, however, in a Soviet pamphlet on US aircraft carriers which asserts that

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the Harrier's combat radius and payload are "extremely limited."

Some criticism of US fighters is accompanied by descriptions of measures taken to correct the deficiencies. A recent article in *Aviation and Cosmonautics* reported F-4 losses in Vietnam caused by the rupture of hydraulic lines to the aircraft's control surfaces. It noted the replacement of the hydraulic system with the less vulnerable SFCS electronic control mechanism. Similarly, a 1968 *Aviation and Cosmonautics* account of the Vietnam war said that the absence of conventional cannon armament had made the F-4 vulnerable to close-in attack. The article stated that this deficiency had been corrected by the addition of a six-barrel Gatling gun, the Vulcan.

Airborne Missiles. Soviet accounts have been highly critical of the performance of US air-launched tactical missiles. [redacted] the military press, and other sources have described the performance of the Sidewinder and Sparrow air-to-air missiles in Vietnam as "ineffective" and "below American expectations." A 1968 article in *Aviation and Cosmonautics* faulted both missiles for unreliability, lack of an IFF capability, and ineffectiveness in aerial combat involving violent maneuvers. Notwithstanding such criticisms, the Soviets have a widely deployed airborne missile system, the AA-2 Atoll, with virtually the same capabilities and deficiencies as the Sidewinder.

The Soviets have followed US efforts both to remedy these deficiencies and to develop the new Phoenix missile as a follow-on system. A 1972 Soviet report said that modified Sparrows and Sidewinders, to be fully deployed by the late Seventies, would have increased range, improved reliability, better maneuverability, higher antijamming resistance, and greater destructive power. The Phoenix was reported to be a long-range missile with excellent all-weather capabilities at all altitudes.

Soviet military authors have commented critically on the combat performance of US air-to-surface missiles.

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The Bullpup, for example, was reported to have demonstrated only "satisfactory" combat qualities. It has been criticized for its ineffective warhead and short range and for requiring continuous guidance to its target, prolonging the exposure of the launching aircraft to enemy air defenses.

Classified and open press articles have been particularly critical of the antiradar Shrike. They identify its "serious shortcomings" as limited range, an ineffective fragmentation warhead, insufficient flight speed, and the ease with which it can be evaded. A classified article admitted, however, that Soviet evasion tactics were advantageous to the attacker, since these precluded the continual operation of SAM radars and thus compromised the effectiveness of the air defense system.

The Soviets have also commented upon newer US antiradar missiles. Recent open press articles have discussed the Standard ARM, noting its improved active and passive guidance system. They note that the Standard's high cost, estimated to be ten times that of the Shrike, has prompted US development of the NARM, a lower cost antiradar missile.

Precision-Guided Munitions. Soviet writers have commented favorably in *Red Star*, *Aviation and Cosmonautics*, and the restricted military press about the new generation of US precision-guided munitions, such as the Walleye, Hobo, Maverick, and Paveway. Laser-guided and electro-optical weapons have been praised for the exceptional accuracy which makes them highly cost-effective in comparison with conventional bombs. Their accuracy has also been said to bring a decrease in aircraft losses because fewer sorties are required to destroy an assigned target. A classified article described the Walleye, a television-guided glide bomb, as the "most successful weapon for the destruction of well defended targets." Strong interest in these weapons was reflected in repeated Soviet visits to an American display of the Laser Aided Rocket System (LARS) and an unsuccessful attempt to steal a laser rangefinder designed by the French during the 1973 Paris Air Show.

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Airborne Electronic Countermeasures. Open and classified press accounts of the US air campaign against North Vietnam have noted the effectiveness of American airborne ECM capabilities. These commentaries have cited the protection provided for US forces both by the B-57 and A-6 specialized countermeasures aircraft and the ECM pods attached to individual strike aircraft.

[redacted] the success of the US ECM effort in Vietnam prompted the Soviets to initiate a program in the late Sixties to develop ECM modules for their own assault aircraft. Such equipment is now appearing on Soviet aircraft deployed in Eastern Europe.

Pilotless Vehicles. US development and use of pilotless vehicles have drawn comment in the Soviet open press. Several articles in *Red Star* and *Aviation and Cosmonautics* have discussed the US use of drones for reconnaissance in Southeast Asia and described US programs to improve the capabilities of unmanned aircraft.

A recent article in *Red Star* criticized the first-generation AN/MQM57A pilotless reconnaissance system for its inability to operate effectively at night or in bad weather. The same source cited the larger AN/MGM58A for its improved all-weather performance but still judged the system essentially obsolete because of its short range, relatively low flight speed, vulnerability, and inability to execute unprogrammed maneuvers. Soviet authors have observed that American interest in the development of unmanned fighter aircraft is based on a desire to build a simple, reliable, and inexpensive means for aerial combat which does not risk the lives of pilots. Noting the complexities of the control systems required for such vehicles and their vulnerability to ECM, one author recently predicted in *Red Star* that, despite vigorous US efforts, the development of effective, maneuverable pilotless aircraft is still some ten years away.

Transport Aircraft. Soviet writers have infrequently discussed the capabilities of specific US transport aircraft. A 1971 article in the monthly

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Wings of the Homeland described the C-5A and C-141 as "heavy and fast aircraft" whose capabilities for quick reaction and long-distance operations had been demonstrated in the movement of US Army units from the US to West Germany during Reforger exercises and in the Vietnam war. The same source cited the long time required to load and unload the C-5A and noted the cost overrun problems associated with its development. A 1970 item in *Red Star* and a recent classified article cited the large carrying capacity of the C-5A. The latter article noted its ability to carry an M60A1 tank, a 175mm gun, and an M577 armored personnel carrier all on a single flight. At the 1971 Paris air show, the chief of the Ilyushin design bureau described his new IL-76 transport aircraft as a small-scale version of the C-5A rather than a scaled-up version of the C-141. Many of the design features and technical characteristics of the IL-76, such as its high flotation landing gear and its short takeoff and landing potential, are patterned after the C-5A's capabilities.

A classified article cited the fact that the C-130 and C-141 transports carry radio-navigational and ECM equipment. It noted the absence of defensive armaments on either of these aircraft, but did not suggest that this compromised their mission. The author explained that these airplanes were designed primarily for operations behind friendly lines rather than in a hostile environment, and implied that they were fully capable of performing in the intended environment.

Tactics

The Soviets have closely studied the performance of US tactical air forces during the Vietnam war.

Soviet operational air units were provided with a variety of briefings and study materials which described US aerial tactics over Indochina in great detail. In addition, the open and restricted military press have carried many articles on the evolution of US air operations in the course of the bombing campaign against North Vietnam.

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Soviet military commentators have noted that the US was able to adapt quickly and successfully to the incremental modernization of the North Vietnamese air defense system. These authors state that American attack units were able to penetrate these defenses through a combination of measures including evasive maneuvers, closely coordinated tactics, effective air defense suppression, and intensive electronic countermeasures. The Soviets have cited this success as evidence of a US commitment "to constantly perfect its methods for overcoming air defenses." One classified article explicitly warned that these and other sophisticated measures were likely to be employed against the Soviets themselves in any future military conflict with the US.

Tactical Air Defense

Soviet commentaries on US tactical air defense capabilities have generally appeared in the context of discussions of the NATO air defense system. Several articles in limited-circulation and open military publications have described the NATO air defense effort as a well integrated and modern system which successfully combines radar detection and tracking equipment, tactical aircraft, surface-to-air missiles, and conventional antiaircraft artillery. Classified military writings have noted that high losses of Soviet aircraft can be anticipated unless they can neutralize NATO's fighter-interceptor force and successfully overcome its SAM defenses. Difficulties in combating aircraft flying at "low and very low level" have been cited as the primary weakness of the Western air defense system.

Classified Soviet writings have identified the Hawk SAM and American fighter-interceptors, especially the F-4 Phantom, as the most potent air defense weapons in NATO. Respect for the Hawk has been reflected in both its identification as a first-priority target in Soviet theater warfare scenarios and in the variety

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of measures (active ECM jamming, direct suppression, avoidance of major Hawk concentrations, and low-level approach tactics) prescribed for overcoming it. The Nike Hercules SAM, although credited with significant capabilities at medium and high altitudes, has been accorded secondary importance because of its inability to engage low-flying targets.

The Soviets have displayed concern over the threat posed by US air defense fighters. Classified commentaries have identified their particular strengths as all-weather, day-night capabilities, high combat readiness, and potential for flexible employment throughout the European combat theater. Classified discussions have repeatedly proposed that planning envisage the destruction or neutralization of US fighter-interceptors, preferably by a surprise attack which would catch them on the ground. If this tactic should fail--and the discussions admit its difficulty because of the high combat readiness of US air forces--then the Soviets have spoken of winning the battle for air superiority in aerial combat. Their high regard for the capabilities of American fighter-interceptors suggests that they realize that prospects for success in this task also are not good.

Soviet military writers have frequently discussed US efforts to improve air defense capabilities against low-altitude targets. Articles in *Red Star* and *Military Herald* on the Chaparral and Red Eye tactical SAMs have criticized both systems for their lack of an identification friend or foe (IFF) capability and for limitations inherent in their heat-seeking infrared guidance system. The Soviets have claimed that these guidance shortcomings limit operations to clear weather, preclude firings toward the sun, and allow the missiles to be launched only against aircraft which have already passed overhead.

Despite these criticisms of US SAM capabilities, a 1971 *Military Herald* article stated that a combination of these tactical SAMs and antiaircraft artillery offers "maximum promise" against aircraft attacking at low altitude, and the Soviets have in

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fact deployed a similar system of their own--the SA-7. This counterpart to the Red Eye also lacks IFF and has a less sophisticated infrared homing system than that of the Red Eye. A new Soviet system, the SA-8, which may have capabilities similar to those of the Chaparral, is still undergoing testing.

Soviet military authors have noted renewed US interest in the procurement of antiaircraft artillery and have linked this development to the demonstrated effectiveness of North Vietnamese AAA against US aircraft. The Soviets themselves have traditionally been enthusiastic about the utility of AAA and they frequently praise its capabilities against low-flying aircraft. Soviet commentators have pointed to the procurement of the 20mm Vulcan system and reactivation of the 40mm M42A1 Duster as evidence of a US commitment to acquire a mobile, reliable, and low-cost AAA capability.

The Vulcan has drawn mixed evaluations from the Soviets. Articles in *Military Herald* and *Red Star* have praised its accuracy and rapid fire capability.

[redacted] however, [redacted] the Vulcan was criticized by Soviet aviators as too small in caliber and having an inadequate explosive charge.

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